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National Occupational Analysis

2012 | Roofer

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Roofer

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FOREWORD

The Canadian Council of Directors of Apprenticeship (CCDA) recognizes this National Occupational Analysis (NOA) as the national standard for the occupation of Roofer.

Background

The first National Conference on Apprenticeship in Trades and Industries, held in Ottawa in 1952, recommended that the federal government be requested to cooperate with provincial and territorial apprenticeship committees and officials in preparing analyses of a number of skilled occupations. To this end, Human Resources and Skills Development Canada (HRSDC) sponsors a program, under the guidance of the CCDA, to develop a series of NOAs.

The NOAs have the following objectives:

- to describe and group the tasks performed by skilled workers;
- to identify which tasks are performed in every province and territory;
- to develop instruments for use in the preparation of Interprovincial Red Seal Examinations and curricula for training leading to the certification of skilled workers;
- to facilitate the mobility of apprentices and skilled workers in Canada; and,
- to supply employers, employees, associations, industries, training institutions and governments with analyses of occupations.

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TABLE OF CONTENTS

FOREWORD			I
ACKNOWLEDGEMENTS			II
TABLE OF CONTENTS			III
STRUCTURE OF ANALYSIS			V
DEVELOPMENT AND VALIDATION OF ANALYSIS			VII
ANALYSIS			
SAFETY			3
SCOPE OF THE ROOFER TRADE			4
OCCUPATIONAL OBSERVATIONS			5
ESSENTIAL SKILLS SUMMARY			6
BLOCK A	**COMMON OCCUPATIONAL SKILLS**		
	Task 1	Performs safety related functions.	8
	Task 2	Maintains and uses tools and equipment.	10
	Task 3	Performs common work practices and procedures.	12
BLOCK B	**ROOF PREPARATION**		
	Task 4	Prepares roof for replacement.	18
	Task 5	Prepares deck for roof installation.	23
BLOCK C	**LOW SLOPE AND FLAT ROOFING**		
	Task 6	Applies roofing components.	27
	Task 7	Applies membranes.	32
BLOCK D	**SHINGLES, TILES AND PRE-FORMED METAL ROOFING**		
	Task 8	Performs common steep slope practices.	39

	Task 9	Applies shingles.	43
	Task 10	Applies roof tiles.	45
	Task 11	Applies pre-formed metal roofing.	48
BLOCK E	**WATERPROOFING AND DAMP-PROOFING**		
	Task 12	Waterproofs surfaces.	52
	Task 13	Damp-proofs surfaces.	55
BLOCK F	**ROOF MAINTENANCE AND REPAIR**		
	Task 14	Assesses roof condition.	57
	Task 15	Maintains and repairs roof.	59

APPENDICES

APPENDIX A	**TOOLS AND EQUIPMENT**	67
APPENDIX B	**GLOSSARY**	70
APPENDIX C	**ACRONYMS**	74
APPENDIX D	**BLOCK AND TASK WEIGHTING**	75
APPENDIX E	**PIE CHART**	78
APPENDIX F	**TASK PROFILE CHART**	79

STRUCTURE OF ANALYSIS

To facilitate understanding of the nature of the occupation, the work performed is divided into the following categories:

Blocks	largest division within the analysis that is comprised of a distinct set of trade activities
Tasks	distinct actions that describe the activities within a block
Sub-Tasks	distinct actions that describe the activities within a task
Supporting Knowledge and Abilities	skills and knowledge that an individual must have to perform a sub-task

The analysis also provides the following information:

Trends	changes identified that impact or will impact the trade including work practices, technological advances, and new materials and equipment
Related Components	list of products, items, materials and other elements relevant to the block
Tools and Equipment	categories of tools and equipment used to perform all tasks in the block; these tools and equipment are listed in Appendix A
Context	information to clarify the intent and meaning of tasks

The appendices located at the end of the analysis are described as follows:

Appendix A — Tools and Equipment	non-exhaustive list of tools and equipment used in this trade
Appendix B — Glossary	definitions or explanations of selected technical terms used in the analysis
Appendix C — Acronyms	list of acronyms used in the analysis with their full name
Appendix D — Block and Task Weighting	block and task percentages submitted by each jurisdiction, and the national averages of these percentages; these national averages determine the number of questions for each block and task in the Interprovincial exam
Appendix E — Pie Chart	graph which depicts the national percentages of exam questions assigned to blocks
Appendix F — Task Profile Chart	chart which outlines graphically the blocks, tasks and sub-tasks of this analysis

Development of Analysis

A draft analysis is developed by a committee of industry experts in the field led by a team of facilitators from HRSDC. This draft analysis breaks down all the tasks performed in the occupation and describes the knowledge and abilities required for a tradesperson to demonstrate competence in the trade.

Draft Review

The NOA development team then forwards a copy of the analysis and its translation to provincial and territorial authorities for a review of its content and structure. Their recommendations are assessed and incorporated into the analysis.

Validation and Weighting

The analysis is sent to all provinces and territories for validation and weighting. Participating jurisdiction consult with industry to validate and weight the document, examining the blocks, tasks and sub-tasks of the analysis as follows:

BLOCKS	Each jurisdiction assigns a percentage of questions to each block for an examination that would cover the entire trade.
TASKS	Each jurisdiction assigns a percentage of exam questions to each task within a block.
SUB-TASKS	Each jurisdiction indicates, with a YES or NO, whether or not each sub-task is performed by skilled workers within the occupation in its jurisdiction.

The results of this exercise are submitted to the NOA development team who then analyzes the data and incorporates it into the document. The NOA provides the individual jurisdictional validation results as well as the national averages of all responses. The national averages for block and task weighting guide the Interprovincial Red Seal Examination plan for the trade.

This method for the validation of the NOA also identifies common core sub-tasks across Canada for the occupation. If at least 70% of the responding jurisdictions perform a sub-task, it shall be considered common core. Interprovincial Red Seal Examinations are based on the common core sub-tasks identified through this validation process.

Definitions for Validation and Weighting

YES	sub-task performed by qualified workers in the occupation in a specific jurisdiction
NO	sub-task not performed by qualified workers in the occupation in a specific jurisdiction
NV	analysis Not Validated by a province/territory
ND	trade Not Designated in a province/territory
NOT COMMON CORE (NCC)	sub-task, task or block performed by less than 70% of responding jurisdictions; these will not be tested by the Interprovincial Red Seal Examination for the trade
NATIONAL AVERAGE %	average percentage of questions assigned to each block and task in Interprovincial Red Seal Examination for the trade

Provincial/Territorial Abbreviations

NL	Newfoundland and Labrador
NS	Nova Scotia
PE	Prince Edward Island
NB	New Brunswick
QC	Quebec
ON	Ontario
MB	Manitoba
SK	Saskatchewan
AB	Alberta
BC	British Columbia
NT	Northwest Territories
YT	Yukon Territory
NU	Nunavut

ANALYSIS

Safe working procedures and conditions, accident prevention, and the preservation of health are of primary importance to industry in Canada. These responsibilities are shared and require the joint efforts of government, employers and employees. It is imperative that all parties become aware of circumstances that may lead to injury or harm. Safe learning experiences and work environments can be created by controlling the variables and behaviours that may contribute to accidents or injury.

It is generally recognized that safety-conscious attitudes and work practices contribute to a healthy, safe and accident-free work environment.

It is imperative to apply and be familiar with the Occupational Health and Safety Acts (OH&S) and Workplace Hazardous Materials Information System (WHMIS) regulations. As well, it is essential to determine workplace hazards and take measures to protect oneself, co-workers, the public and the environment.

Safety education is an integral part of training in all jurisdictions. As safety is an imperative part of all trades, it is assumed and therefore it is not included as a qualifier of any activities. However, the technical safety tasks and sub-tasks specific to the trade are included in this analysis.

SCOPE OF THE ROOFER TRADE

"Roofer" is this trade's official Red Seal occupational title approved by the Canadian Council of Directors of Apprenticeship (CCDA). This analysis covers tasks performed by roofers whose occupational title has been identified by some provinces and territories of Canada under the following names:

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
Roofer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Roofers install, repair and replace flat and sloped roofs. They work with membrane roofing systems that consist of a variety of materials with different application methods. They also install, replace and repair shingles, slate, shakes, roofing tiles, sheet metal and other preformed sheeting on sloped roofs.

Before the work begins, roofers may inspect existing roof systems and determine the extent and procedure for repair of the substrate or removal and replacement of roofing materials. Some roofers may be involved in the estimating of material and installation costs.

As part of the job preparation, roofers may set up scaffolding to provide safe access to the work area and may install fall protection systems. They also weatherproof, waterproof and damp-proof roofing surfaces, foundation walls, floor slabs and bridge decks. They install roofing accessories such as sheet metal flashings, roof vent flashings, anchor bolt flashings, drain inserts and clamps.

Roofers may be employed by roofing companies, general contractors or they may be self-employed. They may work on all types of roofs or may specialize in the flat or low sloped roofs of commercial and industrial buildings or on the steep sloped roofs found in most residential buildings.

Key attributes for people in this trade are mechanical aptitude, manual dexterity and the ability to work as a team. Roofers work primarily outdoors and work may be seasonal. The work environment is exposed and may vary from extreme cold to extreme heat. Roofing is physically demanding work and requires considerable effort in lifting, climbing, bending, kneeling and balancing on high, sloped and sometimes slippery surfaces.

Roofers work in conjunction with other tradespeople in the construction trades. With additional training, roofers may transfer their skills to related occupations such as carpenter or sheet metal worker. With experience, they may advance to positions such as supervisors, contractors or inspectors.

There are increased requirements on the use of fall arrest and restraint equipment to ensure worker safety. The use of personal protective equipment (PPE) such as respirators and hand and eye protection is becoming more important. Employees are often required to participate in the development and implementation of safety procedures and company policies; and to attend safety training.

Due to the concern over fires, more emphasis is being placed on training on the use of open flame. Roofers are increasingly using mechanically fastened and peel-and-stick membranes. There is an increase in concern about chemical fumes entering buildings. This has resulted in more communication with owners, contractors and tenants.

Refuse material is often required to be separated and recycled especially with regard to wood, metals and other materials generated by roofer trade projects.

Roofers are using more automated equipment to move materials and install roofing systems.

A roofers' job is becoming much more complex with the introduction of new roof membranes and more sophisticated roof designs. As a result, there is a need for continuous training and upgrading of skills to ensure proper installation.

Increasing numbers of roof projections such as cell towers and photo-voltaics mean that roofers spend more time detailing and accommodating these features.

There is also an urban trend towards producing more decorative roofs, ensuring that architectural design and structure, as well as membranes, panels and siding match.

The demand for vegetative and sustainable roofing is on the rise in urban centres to replenish lost natural resources such as water and plants and reduce the carbon footprint. There is greater uptake of "Green Construction" practices with regard to rooftop reflectivity and rooftop landscaping. Roofer training increasingly aims to instill working knowledge of scientific and technological concepts associated with energy-conservation and environmentally responsible trade practices.

Organizations such as LEED (Leadership in Energy and Environmental Design) are promoting green building alternatives.

ESSENTIAL SKILLS SUMMARY

Essential skills are needed for work, learning and life. They provide the foundation for learning all other skills and enable people to evolve with their jobs and adapt to workplace change.

Through extensive research, the Government of Canada and other national and international agencies have identified and validated nine essential skills. These skills are used in nearly every occupation and throughout daily life in different ways.

A series of CCDA-endorsed tools have been developed to support apprentices in their training and to be better prepared for a career in the trades. The tools can be used independently or with the assistance of a tradesperson, trainer, employer, teacher or mentor to:

- understand how essential skills are used in the trades;
- learn about individual essential skills strengths and areas for improvement; and
- improve essential skills and increase success in an apprenticeship program.

The tools are available online or for order at: www.hrsdc.gc.ca/essentialskills.

The essential skills profile for the roofer trade indicates that the most important essential skills are **document use, oral communication** and **problem solving**.

The application of these skills may be described throughout this document within the competency statements which support each subtask of the trade. The following are summaries of the requirements in each of the essential skills, taken from the essential skills profile. A link to the complete essential skills profile can be found at www.red-seal.ca.

Reading
Roofers read instructions on work orders as well as application and installation instructions for roofing products and materials. They read information sheets to learn about new products and materials. They also need to refer to blueprints and specifications to complete roofing jobs.

Document Use
Roofers reference documents such as work orders, plans and specifications and site specific safety plans that are required for construction, alteration and repairs. They identify the location and orientation of parts in assembly drawings of equipment. Roofers read Workplace Hazardous Material Information System (WHMIS) documentation to obtain and follow safe handling and application procedures.

Writing
Roofers may write in logbooks and on contract forms and work orders to describe the work that needs to be done. They may fill out maintenance and inspection reports. They are required to complete safety documents according to jurisdictional regulations.

Numeracy
Roofers measure the length, width and height of roof surfaces so they can order the correct amount of materials to complete a roofing job. They also use drawings to calculate material requirements. Roofers use numeracy skills to determine the layout of shingles. They may use thermometers to measure the temperature of roofing materials and working environments to ensure conditions are appropriate for application of the materials.

Oral Communication
Roofers communicate with colleagues, other trade workers, manufacturers and supervisors to discuss and review job and safety requirements. They speak to customers to explain procedures used for application and disposal of roofing material. They may also use specialized communication such as hand signals to communicate with crane or hoist operators when moving material and equipment.

Thinking Skills
Roofers use problem solving skills to address oversights and discrepancies on the job site. They assess roof conditions and consult with supervisors and clients to adjust the scope of a roofing job. They must anticipate changes in weather to prevent damage to an existing roofing structure and to roofing material. Roofers use decision making skills to decide the start and end of work considering factors such as weather and the availability of supplies and labour. They use critical thinking skills to judge the quality of finished roofing jobs. They also test to make sure roofing materials are sealed and have adhered properly.

Working with Others
Most roofers work collaboratively on teams to complete roofing projects. They discuss safety, work processes, installation improvements and quality control.

Computer Use
Roofers may use email to communicate with others in the industry. They may also use the internet to look up product and safety information.

Continuous Learning
Roofers are continuously learning in order to keep abreast of new roofing products, application procedures and safety precautions. They take WHMIS and provincial construction safety courses, as well as other safety-related courses to stay current. Manufacturers sometimes provide training on their products. Roofers may also learn from manuals and newsletters.

BLOCK A — COMMON OCCUPATIONAL SKILLS

Trends

New tools and equipment such as mechanical vacuums and rooftop removal equipment have been introduced to make roofers' tasks easier. There are more cordless tools such as circular saws and reciprocating saws available to roofers. Fire and torch safety regulations are being emphasized more. Safety equipment and PPE is being used more consistently by roofers. Worksite and public safety has become more important. Use of documentation by roofers has increased in order to demonstrate due diligence and compliance with regulations. There is an increase in the use of digital technology to research, communicate, record and document information.

Related Components

All components apply.

Tools and Equipment

See Appendix A.

Task 1 — Performs safety related functions.

Context

Roofers need to recognize and follow regulations and requirements such as OH&S, workplace health and safety (WH&S), Canadian standard association (CSA) and company policy to ensure workplace, public and individual safety.

Required Knowledge

K 1	types of PPE such as harnesses, respirators, eye protection, safety boots, gloves and hearing protection
K 2	safety equipment such as warning lines, guard rails, fire extinguishers and first aid kits
K 3	operating procedures for PPE and safety equipment
K 4	company safety policies, safe work practices and procedures, and reporting system for safety issues
K 5	health and safety regulations and legislation such as WHMIS, WH&S and OH&S

K 6	training and certification requirements
K 7	location of safety equipment and muster points

Sub-task

A-1.01 **Uses personal protective equipment (PPE) and safety equipment.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

A-1.01.01	select PPE according to task
A-1.01.02	verify proper fit of PPE such as gloves, boots, hardhats and eye protection
A-1.01.03	select and operate safety equipment such as fire extinguishers and hoses
A-1.01.04	install safety equipment such as fall restraint and fall protection
A-1.01.05	check PPE and safety equipment such as harnesses, ropes, lanyards and boots for wear, damage or defects and remove from service
A-1.01.06	store PPE and safety equipment in designated area

Sub-task

A-1.02 **Maintains safe work environment.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

A-1.02.01	perform job hazard assessment for safety requirements such as PPE and safety equipment
A-1.02.02	report hazards such as spills, faulty equipment and obstructions to appropriate authority according to company, WH&S and OH&S requirements
A-1.02.03	perform housekeeping such as clean up and removing tripping hazards
A-1.02.04	participate in tool box and site orientation meetings
A-1.02.05	locate first aid kits and muster stations

A-1.02.06	protect public and work areas by setting up barricades and signage
A-1.02.07	position safety equipment such as water hoses, fire extinguishers, safety cones, caution tape and safety fence according to jurisdictional requirements and company policies

Task 2 — Maintains and uses tools and equipment

Context — Roofers' ability to assemble, disassemble, use and maintain tools and equipment is essential to safely completing job tasks.

Required Knowledge

K 1	types of roofing hand tools such as measuring, stripping, cutting, ripping, fastening and application tools
K 2	types of power tools such as cutting, cleaning and fastening tools
K 3	types of pneumatic tools such as caulking guns, nailers, staplers and sprayers
K 4	types of burners such as torches and kettles
K 5	types of propane bottles such as liquid and vapour
K 6	types of hot process equipment such as heating, application and bitumen equipment
K 7	handling procedures
K 8	transportation procedures and regulations for propane cylinders
K 9	equiviscous temperatures (EVT) and flashpoint temperatures
K 10	certification requirements
K 11	types of hoists such as A-frame, monorail, hand, ladder and hydraulic hoist
K 12	rigging such as slings, cables, hooks, shackles and spreader bars
K 13	safe work practices for hoisting, lifting and rigging
K 14	counterweights for hoists
K 15	regulations for hoisting
K 16	manufacturers' operating procedures and requirements
K 17	rated loads of slings, cables, hooks and shackles
K 18	weight distribution when rigging and lifting
K 19	types of motorized equipment related to roofing such as power buggies, roof cutters, and asphalt and gravel spreaders
K 20	small engine maintenance and minor repair

Sub-task

A-2.01 Maintains tools and equipment.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

A-2.01.01	inspect and identify worn, damaged and defective tools and lock-out/tag-out according to company policy
A-2.01.02	lubricate tools and equipment with moving parts such as hoists, pullies, hydraulic drives and bearings
A-2.01.03	monitor and maintain fuel and oil levels
A-2.01.04	replace oil, hydraulic, fuel and air filters
A-2.01.05	dispose of liquids and filters according to environmental and safety regulations
A-2.01.06	clean and service tools and equipment according to maintenance procedures
A-2.01.07	organize and store tools and equipment in protected area

Sub-task

A-2.02 Uses hoisting, lifting and rigging equipment.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

A-2.02.01	inspect components such as hoist frames, pins, motors, connections, cables, hooks, shackles and spreader bars according to operators' manual and lock-out/tag-out, if defective
A-2.02.02	perform job site assessment for potential hazards
A-2.02.03	assemble and disassemble hoist frame and components such as hoists, winches, motors, hoses, counter weights and clutch assemblies according to operator manual
A-2.02.04	raise and lower equipment and materials using rigging devices such as slings, chokers and hoist forks, trash trays, tag lines and hoisting bags
A-2.02.05	position and secure load to rigging devices using items such as ropes and ratchet straps considering weight distribution

A-2.02.06	place and secure counter weights according to manufacturers' specifications
A-2.02.07	establish and barricade lifting and lowering areas
A-2.02.08	protect roof membrane and substrate from counterweights and hoist frames
A-2.02.09	coordinate lift using hand signals or radio communication devices

Sub-task

A-2.03 Uses motorized equipment.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

A-2.03.01	select motorized equipment such as roof top skid steers, sweepers, cutters, roof rippers, roof planers and spudders according to task
A-2.03.02	perform pre-use inspection according to operator manual
A-2.03.03	perform minor adjustments for items such as fluid levels, nuts and bolts and tire pressure
A-2.03.04	tag-out damaged and defective motorized equipment
A-2.03.05	perform job site assessment for potential hazards
A-2.03.06	operate equipment according to task requirements and operator manual
A-2.03.07	protect surrounding areas from flying debris
A-2.03.08	store and secure motorized equipment in protected designated area

Task 3 Performs common work practices and procedures.

Context Roofers regularly interpret blueprints and drawings, estimate materials, assess worksite conditions, communicate with others, set up access to the work area and optimally position materials on the roof and ground.

Required Knowledge

K 1	jurisdictional regulations including separation of materials, use of access equipment and placement of propane tanks and kettles
K 2	documentation such as company, WHMIS and documentation requirements for hazardous goods such as mould and asbestos
K 3	starting and finishing points of work

K 4	adequate curb and parapet height
K 5	job equipment requirements such as disposal chutes and emission control kettles
K 6	types of materials such as membranes, felt, insulation, shingles, panels, adhesives and fasteners
K 7	coverage rates of roofing materials
K 8	types of access equipment such as ladders, scaffolding, scissor lifts and man-lifts
K 9	certification requirements for the operation or erection of access equipment
K 10	where to position equipment such as kettles, propane tanks and disposal bins
K 11	sequence of installation of materials
K 12	components of material disposal systems such as wheelbarrows, garbage bags, chutes and disposal bins
K 13	blueprints components such as architectural, structural, electrical and mechanical

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Sub-task

A-3.01 Interprets blueprints and drawings.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

A-3.01.01	locate and interpret various information such as section and detail views, and elevations on blueprints
A-3.01.02	interpret lines and symbols on blueprints and shop drawings
A-3.01.03	scale blueprints and drawings using tools such as calculators and scale rule

Sub-task

A-3.02 Estimates material.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

A-3.02.01	select and use tools such as calculators and computers
A-3.02.02	convert between metric and imperial measurements
A-3.02.03	calculate area and lineal measurements
A-3.02.04	calculate material coverage to manufacturers' specifications
A-3.02.05	calculate volume and weight of old materials for disposal

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Sub-task

A-3.03 Assesses worksite conditions.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

A-3.03.01	determine access and egress requirements of work area
A-3.03.02	perform assessment to identify hazards such as general public, un-level ground, overhead power lines, heavy equipment and other trades activities
A-3.03.03	assess problems and unsafe areas on roof such as windows, skylights, mechanical equipment, air intakes and uncovered openings
A-3.03.04	identify and document areas of previous damage such as broken windows, stains, spills, and damaged siding to eliminate fault and litigation
A-3.03.05	assess fall protection requirements such as scaffolding, safety railings and control zones
A-3.03.06	identify accessibility of onsite utilities such as water and electrical outlets, and washroom facilities
A-3.03.07	determine material disposal system requirements

Sub-task

A-3.04 Communicates with others.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

A-3.04.01	operate communication equipment such as two-way radios and cell phones
A-3.04.02	coordinate work with supervisors, co-workers, roof inspectors and other tradespersons such as plumbers, electricians, bricklayers, carpenters and sheet metal workers to accomplish task
A-3.04.03	convey information with as much detail as possible, combining drawings, written and verbal instruction to minimize misunderstandings
A-3.04.04	communicate with colleagues and supervisors to establish roles and responsibilities during critical operations
A-3.04.05	notify clients, occupants and general public of precautions taken and effects of operations such as noise, fumes dust and temporary equipment shutdown
A-3.04.06	consult with colleagues and manufacturers' technical personnel to resolve problems, find solutions and establish best practices
A-3.04.07	mentor apprentices
A-3.04.08	use communication methods such as hand signals according to job requirements
A-3.04.09	maintain professionalism and respect in communication with others

Sub-task

A-3.05 Accesses work area.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

A-3.05.01	select access equipment such as scaffolding, ladders and man-lifts according to job conditions and requirements
A-3.05.02	recognize worn, damaged and defective access equipment and take corrective action
A-3.05.03	establish solid and level footing for access equipment such as scissor lifts and man-lifts

A-3.05.04	erect equipment such as ladders and scaffolding according to OH&S regulations
A-3.05.05	secure access equipment such as ladders and scaffolding to building using tie wires, ropes and fasteners
A-3.05.06	operate equipment such as scissors lifts and man-lifts according to manufacturers' specifications, and jurisdictional and OH&S requirements

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Sub-task

A-3.06 Positions equipment and material on the ground and on the roof.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

A-3.06.01	place asphalt kettles and tankers away from windows, doors and ventilation when possible
A-3.06.02	place equipment such as roof top hoist on roof to facilitate lifting of equipment and materials
A-3.06.03	ensure equal weight distribution of equipment and material across structural supports such as joists and trusses
A-3.06.04	ensure materials are loaded in strategic sequence to facilitate installation process
A-3.06.05	elevate material off the ground and roof to protect from moisture using dunnage
A-3.06.06	select temporary covers such as tarps, polyethylene and cargo net to protect from weather conditions such as wind, rain, UV exposure and snow
A-3.06.07	secure and cover equipment and materials with temporary covers using tie-down straps, rope and shrink wrap
A-3.06.08	limit repositioning of material and foot traffic to prevent damage to roof systems

Sub-task

A-3.07 Prepares material disposal systems.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

A-3.07.01	assemble and disassemble material disposal systems such as garbage chutes, and hoppers
A-3.07.02	set-up material disposal systems in locations identified in job site assessment
A-3.07.03	place counterweights according to manufacturers' instructions
A-3.07.04	position trucks and garbage bins according to material disposal system location

Trends

There is an increase in the use of blowers and shop vacs to remove water or debris from decks. More roofs are being vacuumed by other companies prior to roofers arriving to facilitate the removal of debris and to protect the environment. There is an increase in recovery of existing roof components instead of entire replacement. There is an increased demand to sort materials for recycling and reuse. New technologies have been developed to assess the condition of the roof.

Related Components (including, but not limited to)

Primers, cleaners, gasoline, adhesives, propane, rust inhibiting paint, sealants, caulking, fasteners, plates.

Tools and Equipment

Hand tools, power tools, pneumatic tools, propane-fuelled equipment, motorized equipment, PPE and safety equipment, material disposal equipment.

Task 4 Prepares roof for replacement.

Context

Roofers prepare a specific area of the roof to facilitate the removal of the existing roof system and to ensure the replacement system can be installed efficiently.

Required Knowledge

K 1	types of debris such as vegetation, gravel and construction materials
K 2	regulated and hazardous materials such as asbestos materials, mould, droppings, coal tar pitch and used needles
K 3	company safety policies
K 4	types of protection material such as tarps, plywood, blankets and polyethylene
K 5	damage such as broken glass, fume infiltration, staining and fire
K 6	types of roof systems and their components
K 7	weather conditions preventing removal of roof coverings
K 8	sequence of roof removal

K 9	potential hazards such as rotten deck, nails and electric wiring
K 10	recyclable materials
K 11	types of substrates such as roof deck, levelling surface, insulation and cover board
K 12	types of decks such as steel, wood and concrete
K 13	substrate defects such as dents, voids, rot and corrosion
K 14	types of roof deck defects that will affect the performance of the roof such as deterioration, irregularities, deflection of deck, uncured and spalling concrete, and corrosion
K 15	changes to roof mounted equipment
K 16	types of adjustments such as adding slopes to parapet tops and extending pipes, drains and doorsills
K 17	types of water cut-offs such as temporary and permanent
K 18	where and when water cut-offs, temporary seals and temporary drains are required
K 19	types of materials for water cut-offs and temporary seals such as asphalt, sealant and membrane
K 20	compatibility of materials used
K 21	when and how much of the deck to clean and the extent of cleaning required
K 22	hazards associated with methods of cleaning decks such as rust from phenolic insulation
K 23	inspection requirements and when to inspect deck
K 24	required penetrations and parapets
K 25	height and fastening requirements
K 26	clearances and placement of roof penetrations, curbs and parapets
K 27	required components of the penetration such as drains, flashings and chimney flashings
K 28	types of drying techniques such as vacuuming, dry mopping and torching, and their hazards
K 29	effect of weather conditions on drying time

Sub-task

B-4.01 **Protects surrounding area.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

B-4.01.01	identify areas such as windows, walls, skylights, solar panels, mechanical equipment and parking lots where damage may occur from re-roofing process
B-4.01.02	verify air intake mechanical equipment is shut off to prevent fumes from entering the building
B-4.01.03	verify rooftop gas and electrical lines are disconnected or powered down
B-4.01.04	select coverings such as tarps, polyethylene or plywood according to item being protected
B-4.01.05	select and use devices or hardware such as tapes, ropes, straps and screws to secure coverings

Sub-task

B-4.02 **Removes loose debris.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

B-4.02.01	identify debris to be removed such as vegetation, pea gravel and droppings
B-4.02.02	select removal device such as shovels, brooms and wheelbarrows according to the debris that needs to be removed
B-4.02.03	gather, store and dispose of debris in designated containers according to site specific requirements such as LEED

Sub-task

B-4.03 **Removes roofing and flashings.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

B-4.03.01	select method for temporarily sealing the roof using materials such as polyethylene, mop one ply and tarps in the event of sudden weather changes or deteriorated roof decks
B-4.03.02	provide provisions for temporary drainage of the work area such as drop drains, emergency scuppers and pumps
B-4.03.03	estimate area that can be removed and made watertight in a predetermined amount of time
B-4.03.04	select and use tools and equipment such as pry-bars, hammers, stripping spades and roof cutters
B-4.03.05	select removal technique according to type and size of roof
B-4.03.06	remove components such as perimeter flashings, ballast, membranes, shingles and clamping rings in reverse order of installation
B-4.03.07	select refuse disposal method such as garbage chute and hoisted garbage box
B-4.03.08	gather, store and dispose of debris in designated containers according to site specific requirements such as LEED and jurisdictional requirements

Sub-task

B-4.04 **Prepares roof substrate.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

B-4.04.01	ensure substrate is clean and free of protruding nails and foreign materials
B-4.04.02	visually inspect substrate for defects such as gouges and wet insulation
B-4.04.03	identify structural damage such as rusted metal deck and rotten wood deck
B-4.04.04	install a temporary barricade to maintain integrity of work space

B-4.04.05	repair and replace damaged substrate such as insulation and plywood, as required
B-4.04.06	secure loose substrate components such un-adhered insulation and cover boards with mechanical fasteners or adhesives

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Sub-task

B-4.05 Performs minor adjustments to penetrations, curbs and parapets.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

B-4.05.01	select and use tools and equipment such as hammers, saws, drills and fasteners
B-4.05.02	calculate thickness of new roof system to determine penetration, curb and parapet height requirements
B-4.05.03	verify heights of existing penetrations, curbs and parapets to determine if adjustments are required
B-4.05.04	determine if other trades are required to facilitate raising of penetrations, curbs and parapets
B-4.05.05	select and install materials such as dimensional lumber, plywood and ABS pipe to extend the heights of penetrations, curbs and parapets according to field measurements, blueprints or specifications
B-4.05.06	determine if roof drains are sumped to facilitate positive drainage
B-4.05.07	alter height of drain using a retrofit drain or existing drain assembly

Sub-task

B-4.06 **Installs water cut-offs, temporary seals and temporary drains.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

B-4.06.01	determine water cut-off or temporary seal membrane compatibility with existing roof and new roofing materials
B-4.06.02	prepare existing roof surfaces using procedures such as spudding, granular embedding or washing with soap and water or solvent to accept water cut-off or temporary seal membrane
B-4.06.03	apply water cut-off or temporary seal using techniques such as torch-applied, self-adhering or mastic to prevent moisture infiltration
B-4.06.04	determine on-site requirements and install temporary roof drainage such as retrofit drain, emergency scupper or roof pumps
B-4.06.05	verify integrity of water cut-offs, temporary seals and temporary drains by visual inspection

Task 5 Prepares deck for roof installation.

Context

Before installing a new roofing system, roofers need to ensure that the deck that will receive roofing is clean, dry, free of defects and secured in place. The performance of the roof depends on the quality of the deck and its components. Decks need to be prepared for roof replacement and for new construction.

Required Knowledge

K 1	types of decks such as steel, wood, concrete and structural stramit
K 2	when and how much of the deck to clean and the extent of cleaning required
K 3	hazards associated with methods of cleaning decks such as rust from phenolic insulation
K 4	inspection requirements and when to inspect deck
K 5	types of defects that will affect the performance of the roof such as deterioration, irregularities, deflection of deck, uncured concrete and corrosion
K 6	required penetrations and parapets

K 7	fastening requirements
K 8	clearances and placement of roof penetrations, curbs and parapets
K 9	required components of the penetration such as drains, flashings and chimney flashings
K 10	types of drying techniques such as vacuuming, dry mopping and torching, and their hazards
K 11	effect of weather conditions on drying time
K 12	temporary coverings such as tarps

Sub-task

B-5.01 Inspects deck.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

B-5.01.01	perform visual inspection for defects and if clean-up or repairs are required
B-5.01.02	determine responsibility for clean-up or repairs
B-5.01.03	verify through visual inspection and/or authority sign-off that the deck is fully cured, secured and crimped, or fastened
B-5.01.04	verify un-cut deck openings are clearly marked through communication with the contractor or other trades, and according to blueprints and specifications
B-5.01.05	verify existing deck openings are fully supported and securely covered

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Sub-task

B-5.02 Cleans deck.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

B-5.02.01	determine amount of deck to be cleaned according to amount of roofing to be installed that day considering factors such as weather and manpower
B-5.02.02	select and use tools and equipment such as shovels, brooms, rags and air compressors according to cleaning technique
B-5.02.03	select and use cleaning solvents according to task

B-5.02.04	remove materials such as dimensional lumber, plywood and steel studs and place in designated area
B-5.02.05	remove debris such as paper, sawdust and concrete to a designated disposal bin or area
B-5.02.06	remove and dispose of contaminants such as grease, oil, and adhesive spills according to WHMIS
B-5.02.07	limit access to cleaned area using ropes and other barricade materials

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Sub-task

B-5.03 Verifies placement of roof penetrations, curbs and parapets.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

B-5.03.01	confirm location of all roof penetrations, curbs and parapets according to job specifications or through communication with trades responsible
B-5.03.02	measure height of penetrations, curbs and parapets to verify they allow for the height of the roofing system, according to blueprints and specifications
B-5.03.03	confirm secure installation of roof penetrations, curbs, cant strips and parapets
B-5.03.04	verify that materials used for penetrations, curbs and parapets are compatible with roof system

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Sub-task

B-5.04 Dries deck.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

B-5.04.01	determine amount of deck to be dried according to amount of roofing to be installed that day considering factors such as weather and manpower
B-5.04.02	determine method of drying according to composition of deck, amount of moisture present and type of moisture such as ice, snow or water
B-5.04.03	remove excess moisture using tools or equipment such as squeegees, blowers, buckets, wheelbarrows, and brooms and shovels

B-5.04.04	remove remaining moisture using tools and equipment such as dry mop, roofer's torch or shop vacuum
B-5.04.05	perform visual or tactile inspection to confirm deck is dry to allow the application of roofing
B-5.04.06	temporarily cover dried deck with tarps to protect from further exposure to moisture such as snow, frost or rain

Trends	Due to fire safety concerns, processes have been modified to reduce the use of flame on combustible material. There is an increase in the use of low rise foam adhesives and cold adhesives.
Related Components (including, but not limited to)	Structural deck, lightning rods, mechanical equipment anchors, flashings, adhesives, fasteners, membranes, vapour barriers, insulation, cover boards, drains, vents, penetrations, gravel, ballast, primers, asphalt, curbs, roof hatch, parapets, fall arrest anchors.
Tools and Equipment	Hand tools, power tools, pneumatic tools, , propane-fuelled equipment, hoisting, rigging and lifting equipment, hot process equipment, PPE and safety equipment.

Task 6 Applies roofing components.

Context Roofing components such as vapour barriers, insulation and flashings work together to optimize the energy efficiency of buildings.

Required Knowledge

K 1	manufacturers' specifications
K 2	levelling surfaces such as gypsum products and sheeting boards
K 3	types of adhesives
K 4	joint sealing requirements
K 5	types of fasteners such as nails, screws, clips and plates
K 6	fastener pattern layout required
K 7	types of installation methods such as adhered, loose-laid and mechanically fastened
K 8	types of primers such as water-based and solvent-based
K 9	effects of environmental conditions on application of primer
K 10	types of vapour barriers and air barriers such as polyethylene, peel-and-stick, torched-on, kraft laminate and two-ply felt, and their application methods
K 11	amount of side and end laps

K 12	types of insulation such as polyiso, extruded polystyrene, expanded polystyrene and fibreglass
K 13	sloped-insulation systems
K 14	types of cover boards such as wood fibre, fibreglass, styrene-butadiene-styrene (SBS) and asphalt-impregnated boards
K 15	compatibility of materials
K 16	drain locations
K 17	drain components and accessories
K 18	flashings such as roof plumbing vents, B-vents and chimney flashings
K 19	types of metal flashings such as aluminium, copper and stainless steel
K 20	cutting and fitting methods
K 21	expansion and contraction of flashings
K 22	watershed design principles
K 23	types of ballast such as gravel, pavers and cement-top insulation
K 24	application and coverage rates
K 25	methods to protect membranes
K 26	environmental concerns such as UV damage and wind up-lift
K 27	types of walkway products such as cement pavers and thermo-fusible walkways
K 28	locations of walkways
K 29	quantity of insulation, adhesives and mineral

Sub-task

C-6.01 Installs levelling surface.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

C-6.01.01	select and use tools and equipment such as drywall knives, electric drills, chalk lines, measuring tapes, keyhole saws and T-squares
C-6.01.02	verify levelling surface layout, installation procedure and materials required according to specifications
C-6.01.03	measure, cut, fit and place levelling surface according to roof size and obstructions

C-6.01.04	secure levelling surface to substrate using fasteners and adhesives according to specifications
C-6.01.05	seal joints using materials such as tape to prevent leakage

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Sub-task

C-6.02 Primes substrate.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

C-6.02.01	select tools and equipment such as spray applicators, rollers and brushes
C-6.02.02	protect surfaces such as interior and exterior finishes and surrounding environment from splatter and spills
C-6.02.03	apply primer according to manufacturers' coverage rates

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Sub-task

C-6.03 Applies vapour retarder, vapour barrier and air barrier.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

C-6.03.01	perform visual and sensory inspection to ensure primer is dry
C-6.03.02	verify material for application
C-6.03.03	select and use tools and equipment such as utility knives, propane torches, and adhesive applicators
C-6.03.04	measure, cut, fit and place material according to manufacturers' recommendations
C-6.03.05	protect roof deck and cover board from open flame or adhesive spills by using protection tape
C-6.03.06	overlap and seal side and end laps according to manufacturers' recommendations
C-6.03.07	tie-in vapour barrier and air barrier to building envelope using methods such as torches, adhesives, sealants and tapes to ensure continuity

Sub-task

C-6.04 Installs insulation.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

C-6.04.01	select and use tools and equipment such as handsaws, hotwires, measuring tapes, chalk lines, reciprocating saws and knives
C-6.04.02	establish and maintain layout pattern during installation according to specifications and shop drawings
C-6.04.03	measure, cut, fit and place material to ensure a tight fit
C-6.04.04	secure insulation using fasteners or adhesives according to specifications
C-6.04.05	prevent damage to material integrity from asphalt burnouts, open flames and moisture

Sub-task

C-6.05 Installs cover board.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

C-6.05.01	select and use tools and equipment such as drywall knives, electric drills, chalk lines, measuring tapes, keyhole saws and T-squares
C-6.05.02	verify cover board layout, installation procedure and materials required according to specifications
C-6.05.03	establish and maintain layout pattern during installation according to specifications
C-6.05.04	measure, cut, fit and place cover board according to roof size and obstructions
C-6.05.05	secure cover board to substrate using fasteners and adhesives according to specifications
C-6.05.06	protect underlying roof components from open flame or adhesive spills by using protection tape

Sub-task

C-6.06 Installs drains, vents, curbs and penetrations

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

C-6.06.01	select and use tools and equipment such as utility knives, hand saws, scissors, wrenches, drills, caulking guns and screw drivers
C-6.06.02	select sealant such as cut-off and modified mastics, and membranes according to specifications
C-6.06.03	determine location of drains according to plans or shop drawings
C-6.06.04	sump drain areas to minimize ponding water
C-6.06.05	cut and remove materials to place drains, curbs or penetrations and ensure fit
C-6.06.06	place vent flashing and seal
C-6.06.07	calculate heights required for curbs considering material thickness
C-6.06.08	insert and level drains, curbs and penetrations
C-6.06.09	seal membrane to drains, vents, curbs and penetrations according to manufacturers' specifications
C-6.06.10	install mastic and clamping ring for drains
C-6.06.11	install drain screen to clamping ring

Sub-task

C-6.07 Applies ballast, walkways and protective surfaces.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

C-6.07.01	select and use tools and equipment such as motorized equipment, shovels, wheel barrows, dollies, torches, hot air welders, probes and rakes
C-6.07.02	inspect ballast for proper size and cleanliness according to roofing system specified
C-6.07.03	cut, fit and place filter fabric where required
C-6.07.04	spread loose-laid ballast material evenly to meet wind up-lift requirements
C-6.07.05	imbed gravel protective surface evenly into cold or hot liquid process material

C-6.07.06	cut, lay out and place patio stones and cement top insulation according to drawings and specifications
C-6.07.07	maintain level elevation of walkway during installation

Sub-task

C-6.08 Installs metal flashings.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

C-6.08.01	select and use tools such as tin snips, measuring tapes, protractors, caulking guns, electric shears and drills
C-6.08.02	determine locations and size of flashings to be installed by measuring roof parapets, penetrations and roof junctions
C-6.08.03	measure and cut metal flashings
C-6.08.04	fit metal flashings together with slip joints such as standing seam joint locks, S-locks and T-joints
C-6.08.05	match gauge and colour of flashings to existing flashing material
C-6.08.06	secure metal flashings using screws, nails and retaining clips
C-6.08.07	caulk metal flashings

Task 7 Applies membranes.

Context Applying membranes is an essential part of the roofing trade because this prevents water from entering a building and prevents damage to building components.

Required Knowledge

K 1	types of hot process-applied membranes such as built-up roofing (BUR), single-ply, and SBS
K 2	types of membranes that require heat welding such as polyvinyl chloride (PVC) and thermoplastic polyolefin (TPO)
K 3	types of membranes that can be installed using loose-laid method such as ethylene-propylene-diene-terpolymer (EPDM)

K 4	types of membranes that can be applied using cold process
K 5	types of membranes that require relaxing
K 6	manufacturers' specifications
K 7	techniques for relaxing membranes such as warming with torch and laying in place
K 8	membrane setting techniques such as throwing felt, dry setting and back rolling
K 9	membrane cleaners and sealants
K 10	effects of environmental conditions such as temperature, wind and moisture
K 11	amount of side and end laps
K 12	hot-liquid and cold process equipment such as mops, squeegees and mechanical applicators
K 13	types of asphalt such as 1, 2, 3
K 14	types of torch-on membrane equipment such as torches, tanks and dollies
K 15	importance of continuous adhesion
K 16	amount of offset of multi-layer membrane installations
K 17	policies on fire watch procedures
K 18	types of hot-air welders such as automatic and hand-held
K 19	types of adhesives such as two-part, solvent and water-based
K 20	roofing systems requiring mechanical fastening and/or adhesive securement
K 21	types of mechanical fasteners such as screws, plates and bars
K 22	types of decking such as wood , concrete and steel
K 23	types of ballast such as gravel, pavers and cement-top insulation
K 24	perimeter securing requirements
K 25	types of membrane flashings such as self-adhesive, modified bitumen, felt, rubber and pressure sensitive
K 26	starting point
K 27	locations requiring flashing such as curbs, parapets and roof upstands

Sub-task

C-7.01 Relaxes membranes.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

C-7.01.01	select and use tools such as utility knives and torches
C-7.01.02	remove labelling and wrappers from rolls
C-7.01.03	unroll membrane within proximity of installation
C-7.01.04	heat membrane to accelerate relaxing
C-7.01.05	position weights to weigh down membrane and prevent displacement by wind
C-7.01.06	visually inspect membrane to verify it lays flat

Sub-task

C-7.02 Sets membranes.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

C-7.02.01	select and use tools and equipment such as utility knives, measuring tape and T-squares
C-7.02.02	establish starting point at lowest point of the roof
C-7.02.03	measure and cut membrane
C-7.02.04	position and overlap membrane sheets and rolls according to type of membrane and direction of slope
C-7.02.05	visually verify membrane layout and alignment

Sub-task

C-7.03 Applies membranes using hot-liquid process.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

C-7.03.01	select and use tools and equipment such as hot tar kettles, hot tar carriers, asphalt mop pails, mini moppers, cotton/fibreglass mop heads, brooms, heat guns and knives
C-7.03.02	monitor temperature of asphalt with a thermometer to maintain integrity and viscosity
C-7.03.03	mop or pour asphalt at a minimum rate of 20 to 25 pounds per 100 square feet
C-7.03.04	roll membrane into hot asphalt
C-7.03.05	broom membrane in place to enhance adhesion

Sub-task

C-7.04 Applies membranes using torched-on method.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

C-7.04.01	select and use tools and equipment such as torches, knives, roll pullers, trowels, and de-granulators
C-7.04.02	torch-weld rolls in place
C-7.04.03	monitor propane pressure and adjust torch flame to ensure temperature of flame
C-7.04.04	press seam with sponge or trowel to ensure surfaces are bonded
C-7.04.05	maintain continuity of bitumen bleed-out as roll is torch welded into place
C-7.04.06	embed granules at end laps before applying overlapping sheet

Sub-task

C-7.05 Applies membranes using hot-air welding.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

C-7.05.01	select and use tools and equipment such as hand and automatic hot-air welders, probes, hand rollers, hand scrubbers and scissors
C-7.05.02	ensure overlapping membrane is clean and free of debris
C-7.05.03	perform field test with sample membrane to confirm hot-air-welder setting and that welds will be sufficient for environmental conditions
C-7.05.04	hot-air-weld side and end laps using automatic hot-air-welder
C-7.05.05	perform primary and secondary welds moving from inside to outside of material using rollers and hand-held hot-air-guns
C-7.05.06	probe seams for continuity and repair defects
C-7.05.07	apply membrane sealants to cut edges according to membrane type

Sub-task

C-7.06 Applies membranes using cold process.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

C-7.06.01	select and use tools and equipment such as cold adhesive applicators, rollers, brushes, trowels, knives, scissors and squeegees
C-7.06.02	apply cold process materials such as adhesives and mastics at coverage rates according to manufacturers' specifications
C-7.06.03	verify cold process material is ready to accept membrane according to manufacturers' specifications
C-7.06.04	broom and roll membranes into cold process material to enhance adhesion

Sub-task

C-7.07 Applies membranes using mechanical fasteners.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

C-7.07.01	locate utilities such as water lines, electrical equipment and drainage systems to avoid potential damage
C-7.07.02	select and use tools and equipment such as drills and screw guns
C-7.07.03	determine types of fasteners and lengths according to plans and specifications
C-7.07.04	fasten membrane according to pattern outlined by manufacturer to meet wind up-lift requirements
C-7.07.05	ensure adequate tension of fasteners to prevent stripping or decreased holding strength

Sub-task

C-7.08 Applies loose-laid membranes.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

C-7.08.01	select and use tools and equipment such as rollers, brushes, scrubbers, scissors and knives
C-7.08.02	prepare side and end laps by removing talc and other contaminants with scrubbers and cleaners
C-7.08.03	spread adhesives or tapes along the side and end laps according to manufacturers' specifications
C-7.08.04	roll seams with hand roller
C-7.08.05	apply sealant where required

Sub-task

C-7.09 Installs membrane flashings.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

C-7.09.01	select and use tools and equipment such as rollers, brushes, trowels, scrubbers, scissors, mop carts, kettles, torches and knives
C-7.09.02	measure and cut membrane
C-7.09.03	shape membrane by bending or heating to form to parapets, penetrations or roof and wall transitions
C-7.09.04	install materials such as primers, adhesives and liquids to accept membrane flashing on substrate
C-7.09.05	install successive layers according to type of membrane such as two-ply SBS and built-up roofing

BLOCK D — SHINGLES, TILES AND PRE-FORMED METAL ROOFING

Trends

Designs for shingles, tiles and metals have changed significantly. Roof components are increasingly designed to meet architectural and longevity concerns. Customer choice in these products has increased. Underlayment materials and application methods have improved to prevent leakage from ice damming.

Related Components (including, but not limited to)

Shingled Roofing Components: nails, staples, underlayment (felt, self-adhesive eave protection), asphalt shingles, fibreglass shingles, SBS shingles, laminate shingles, wood shingles and shakes, mastics, flashing, starter strips.

Tiled Roofing Components: nails, screws, clay tiles, concrete tiles, slate tiles, metal tiles, composite tiles, rubber tiles, strapping, mortar, underlayment (felt, self-adhesive eave protection), flashing, closure strips, caulking.

Metal Roofing Components: pre-formed metal, screws, clips, pop rivets, butyl tape, caulking, snow guards, flashing, underlayment (felt, peel-and-stick membranes), closure strips.

Tools and Equipment

Hand tools, power tools, pneumatic tools, butane-fuelled equipment, hoisting, lifting and rigging equipment, PPE and safety equipment.

Task 8 — Performs common steep slope practices.

Context

Roofers need to understand the basic principles and jurisdictional requirements of water shedding roof systems.

Required knowledge

K 1	valley treatment styles
K 2	valley type such as woven, closed cut and open
K 3	safety procedures
K 4	minimum overlap

K 5	jurisdictional requirements
K 6	manufacturers' specifications
K 7	national and jurisdictional building codes
K 8	types of underlayment such as felt, mineral surfaced, peel-and-stick and modified bitumen, and their termination heights
K 9	basic carpentry
K 10	geometric principles such as area and slope
K 11	fastening patterns
K 12	reasons for venting spaces and requirements
K 13	deck types and requirements
K 14	material types and compatibility
K 15	types of vent flashing such as attic, ridge, turbine, plumbing vents and goose neck exhausts, and their location
K 16	types of metal flashing such as drip edge, rake edge, chimney, base, counter, step, thru-wall and back pan

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Sub-task

D-8.01 **Installs steep slope underlayment.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

D-8.01.01	select and use tools such as hammers, staplers, hatchets and knives
D-8.01.02	relax underlayment by unrolling material to ensure material is straight and flat before installation
D-8.01.03	apply self-adhesive eave protection according to roof slope and jurisdictional regulations
D-8.01.04	measure, cut, and fit underlayment according to roof size and obstructions
D-8.01.05	overlap underlayment material according to manufacturers' specifications and roof slope

Sub-task

D-8.02 Installs attic vent flashings.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

D-8.02.01	verify venting requirements according to attic space
D-8.02.02	cut deck for continuous ridge and off-ridge venting according to roof design
D-8.02.03	select and use tools such as caulking guns, hammers and hatchets
D-8.02.04	fasten roof vents to prevent displacement
D-8.02.05	seal roof vents with mastics and caulking to ensure water shedding

Sub-task

D-8.03 Installs valley treatments.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

D-8.03.01	determine valley type and style according to specifications
D-8.03.02	select and use tools such as tin snips, metal shears and hammers
D-8.03.03	position shingles, tiles and metal roofing according to valley type and manufacturers' specifications
D-8.03.04	mitre cut and fit shingles, roof tiles and metal tiles according to slope of roof, valley type and manufacturers' specifications

Sub-task

D-8.04 Installs saddles/crickets.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

D-8.04.01	determine saddles and crickets requirements according to specifications
D-8.04.02	determine materials according to deck type and specifications
D-8.04.03	build saddles/crickets by cutting and installing material to match slope
D-8.04.04	select and use tools and equipment such as saws, measuring tapes, bevels and hammers

Sub-task

D-8.05 Installs metal flashings for steep slope roofs.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

D-8.05.01	determine flashing requirements according to specifications
D-8.05.02	determine flashing material according to compatibility of roofing material
D-8.05.03	match gauge and colour of flashing to existing flashing material
D-8.05.04	apply flashing by using overlaps according to specifications
D-8.05.05	seal flashing according to flashing material
D-8.05.06	select and use fasteners for specific application and according to roofing material and deck type
D-8.05.07	cut and form flashing according to roof slope

Task 9 — Applies shingles.

Context — Shingles are in high demand in residential and commercial projects. Shingles are commonly used for steep slope roofing.

Required Knowledge

K 1	types of flashings such as drip edge, rake edge, valley, chimney, step, base, counter, thru-wall and back-pan
K 2	types of vents such as attic, ridge, turbine, plumbing and goose neck
K 3	basic carpentry
K 4	types of underlayment such as felt, peel-and-stick and mineral surfaced
K 5	compatibility of materials
K 6	causes of ice damming
K 7	potential problems caused by ice damming and condensation
K 8	installation methods considering the location
K 9	applications for different slopes
K 10	shape and slope of roof
K 11	shingle patterns such as brick and random pattern
K 12	types and lengths of fasteners such as nails and staples
K 13	fastening patterns
K 14	exposure, offset and overlap allowances
K 15	wind-proofing methods
K 16	reasons for venting spaces
K 17	cutting techniques for wood and asphalt shingles

Sub-task

D-9.01 Determines layout of shingles.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

D-9.01.01	measure squareness of deck to establish starting point and to determine shingle overhang requirements
D-9.01.02	use chalk line to establish proper alignment of shingles

D-9.01.03	establish layout sequence according to roof style and roof material
D-9.01.04	select and use tools such as measuring tapes and chalk lines
D-9.01.05	match coursing at dormers to ensure alignment of shingles

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Sub-task

D-9.02 Installs starter strips.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

D-9.02.01	determine offset alignment of shingle starter course to ensure watershedding
D-9.02.02	verify overhang to ensure water runoff in the gutter
D-9.02.03	fasten starter strips according to manufacturers' specifications
D-9.02.04	select and use tools such as hammers, utility knives and saws

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Sub-task

D-9.03 Fastens shingles.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

D-9.03.01	determine fastener location according manufacturers' specifications
D-9.03.02	select and use fastener according to shingle material
D-9.03.03	maintain shingle pattern to ensure alignment of shingles and visual aesthetics
D-9.03.04	fasten hip and ridge caps to complete installation
D-9.03.05	select and use tools such as pneumatic nailer, chalk lines, hatchets and utility knives

Sub-task

D-9.04 **Cuts shingles.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

D-9.04.01	select and use tools and equipment such as circular saws, utility knives, hatchets and bevel squares
D-9.04.02	perform cuts to fit roof penetrations such as flashing, vents, edges, valleys and projections
D-9.04.03	perform cuts to facilitate offset
D-9.04.04	perform cuts to form hip and ridge caps

Sub-task

D-9.05 **Tabs shingles.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

D-9.05.01	select and use tools such as caulking guns and pry-bars
D-9.05.02	lift shingle to facilitate application of adhesive without damaging shingle
D-9.05.03	select and apply adhesive according to manufacturers' specifications

Task 10 Applies roof tiles.

Context Tiles are selected for roofing material for several reasons, including their longevity, architectural and fire resistant qualities.

Required Knowledge

K 1	types of underlayment such as felt and proprietary underlays
K 2	installation methods of components such as strapping, ridge capping and closure strips
K 3	reasons for underlayment such as ice and water damming protection

K 4	reasons for venting attic spaces
K 5	types of vents such as attic, ridge, plumbing and goose neck, and their locations
K 6	types of flashings such as valley, step, rake edge, chimney, base, counter, thru-wall and back-pan
K 7	types of flashing materials such as lead, plastic, copper and other metals
K 8	compatibility of materials
K 9	basic carpentry
K 10	types of fasteners such as screws and nails
K 11	types of closure strips such as foam closures, bird stops and screens, and their purpose
K 12	specified fastening pattern
K 13	specialized cutting tools such as diamond bit blades and tile cutters
K 14	where to mortar
K 15	suitable environmental conditions for applying mortar
K 16	mixing and colouring mortar methods

Sub-task

D-10.01 Installs strapping.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	no	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

D-10.01.01	ensure roof plane is true by visually inspecting for bowing or sagging of rafters and deck
D-10.01.02	determine strapping size and layout according to size and style of roof tiles
D-10.01.03	use chalk lines to establish layout pattern
D-10.01.04	identify rafter location and fastening pattern
D-10.01.05	select fastener, and cut, fit and place strapping

Sub-task

D-10.02 Fastens roof tiles.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	no	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

D-10.02.01	select types of fasteners such as galvanized nails, stainless steel wire and clips according to manufacturers' specifications
D-10.02.02	establish layout patterns according to manufacturers' specifications
D-10.02.03	attach tiles to strapping according to manufacturers' specifications, environmental conditions and jurisdictional regulations
D-10.02.04	prevent tile damage during installation by limiting foot traffic on roof tiles

Sub-task

D-10.03 Cuts roof tiles.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	no	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

D-10.03.01	select and use tools such as cut-off saws, tile nippers and chalk lines
D-10.03.02	determine cut according to tile location such as valleys, hips and ridges
D-10.03.03	perform cuts to accommodate roof penetrations

Sub-task

D-10.04 **Installs closure strips.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	no	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

D-10.04.01	identify location and amount of closure strips required according to style and type of tile to eliminate moisture infiltrations
D-10.04.02	secure closure strips according to manufacturers' specifications
D-10.04.03	select and use tools such as caulking guns and utility knives

Sub-task

D-10.05 **Seals ridge and hip caps.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	no	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

D-10.05.01	mix mortar according to manufacturers' specifications and tile colour
D-10.05.02	apply mortar to areas according to manufacturers' specification
D-10.05.03	select and use tools such as trowels, mixers and buckets

Task 11 Applies pre-formed metal roofing.

Context Metal roofs are popular in the warehouse, institutional and commercial construction sectors, especially in full metal buildings. They are also found in residential construction. They are available in a wide variety of colours and profiles.

Required Knowledge

K 1	types of underlayment such as felt, mineral surfaced, peel-and-stick and modified bitumen
K 2	amount of side and end laps
K 3	installation methods

K 4	basic carpentry
K 5	types of strapping such as Z-bar, wood and hat channels
K 6	compatibility of strapping and metal roofing
K 7	types of fasteners such as screws and nails
K 8	types of closure strips such as foam and metal
K 9	purpose and location of closure strips
K 10	manufacturers' specifications for screw placement and clip placement
K 11	types of seams such as batten, S-lock, single and double-standing
K 12	types of flashings such as drip edge, rake edge, chimney, base, valley, counter, thru-wall and back-pan
K 13	specialized cutting tools such as aviation snips (left and right handed), nibblers, tin snips and quick-cut saws
K 14	types of ridge venting such as pre-formed and hood, and their purpose
K 15	techniques used to apply ridge venting
K 16	types of snow guards such as metal and plastic, and their purpose
K 17	snow guard fastening methods such as screwed and bolted

Sub-task

D-11.01 Installs strapping for pre-formed metal roofing.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	no	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

D-11.01.01	ensure roof plane is true by visually inspecting for bowing or sagging of rafters or deck
D-11.01.02	determine strapping size and layout according to style of pre-formed metal roofing
D-11.01.03	use chalk lines to establish layout pattern
D-11.01.04	identify rafter location and fastening pattern
D-11.01.05	select fastener, and cut, fit and place strapping

Sub-task

D-11.02 Fastens pre-formed metal roofing.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	no	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

D-11.02.01	install hook strip to prevent wind up-lift
D-11.02.02	place panels according to predetermined layout
D-11.02.03	set driver torque to prevent damage to screws, washers and panels
D-11.02.04	determine fastening points according to manufacturers' specifications
D-11.02.05	attach pre-formed metal panels using fasteners such as self tapping screws, drag screws and concealed clips
D-11.02.06	select and use tools such as hand and power seamers

Sub-task

D-11.03 Cuts sheet metal.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	no	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

D-11.03.01	select and use tools and equipment such as nibblers, aviation snips (tin snips) and bulldog snips
D-11.03.02	perform cuts and fit sheet metal to roof penetrations and obstructions
D-11.03.03	ensure straight cuts by using tools such as chalk lines, T-squares and sliding T-bevel

Sub-task

D-11.04 **Installs closure strips for pre-formed metal roofing.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	no	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

D-11.04.01	identify location and amount of closure strips required according to style and type of sheet metal panel to eliminate moisture infiltrations
D-11.04.02	secure closure strips according to manufacturers' specifications by using fasteners such as screws, caulking, pop rivets and staples
D-11.04.03	select and use tools such as caulking guns, drills, utility knives and hand riveters

Sub-task

D-11.05 **Installs snow guards.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	no	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

D-11.05.01	fasten snow guards in uniform pattern according to plans and specifications
D-11.05.02	select and use tools such as wrenches, drills and chalk lines

BLOCK E WATERPROOFING AND DAMP-PROOFING

Trends	The use of modified bituminous membranes for waterproofing is increasing. Roofers are becoming more involved with the installation of green, sustainable and vegetative systems.
Related Components (including, but not limited to)	Primers, sheet membranes, protection materials, two-part waterproofing membranes, hot rubber compounds, cold process membranes.
Tools and Equipment	Hand tools, power tools, pneumatic tools, propane fuelled equipment, hoisting, rigging and lifting equipment, hot process equipment, PPE and safety equipment.

Task 12 Waterproofs surfaces.

Context

This work involves interior and exterior areas under hydrostatic pressure. Waterproofing applications are done on vertical, horizontal and sub-grade surfaces. Waterproofing components include primers, insulation and membranes. Waterproofing applications are associated with protected membrane assemblies (PMA) and green, sustainable or vegetative waterproofing systems.

Required Knowledge

K 1	types of surfaces to be waterproofed such as wood, concrete and cinder blocks
K 2	types of primers such as water-based and solvent-based
K 3	types of waterproofing membranes such as peel-and-stick, torch-on, cold process and hot rubber compound
K 4	specialized heating requirements
K 5	specialized detailing requirements
K 6	amount of side and end laps
K 7	types of protection layers such as sanded base sheet, rigid asphalt board and polyethylene sheet
K 8	PMA assemblies such as drainage mats, insulation, filter fabrics and ballast

K 9	green and vegetative waterproofing components such as root barriers, moisture retention mats and growing mediums
K 10	repairs to green and vegetative waterproofing systems
K 11	irrigation systems in green and vegetative waterproofing
K 12	importance of root barriers
K 13	drainage systems in green and vegetative waterproofing
K 14	vegetative-free zones in green and vegetative waterproofing

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Sub-task

E-12.01 Prepares waterproofing substrates.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

E-12.01.01	identify below-grade hazards such as cave-ins from dirt or rocks, uneven working surface, standing water, buried utility lines, and un-shored slopes
E-12.01.02	visually inspect substrate for defects, debris and moisture
E-12.01.03	clean and dry surface using brooms, scrapers and torches
E-12.01.04	fill cracks and voids with compatible product
E-12.01.05	barricade area to prevent contamination
E-12.01.06	select method of application of primer such as rollers, brushes and spray applicators
E-12.01.07	apply primer according to manufacturers' specifications
E-12.01.08	allow primer to set or flash off completely

Sub-task

E-12.02 Applies waterproofing membrane.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

E-12.02.01	select type of waterproofing material such as hot rubber, torch-on membranes, cold process and self-adhered membranes according to manufacturers' specifications
E-12.02.02	select and use tools and equipment such as torches, air-jacket kettles (indirect fire kettles), squeegees, hot buckets and rollers to apply waterproofing membrane
E-12.02.03	install waterproofing material according to manufacturers' specifications
E-12.02.04	apply reinforcing ply such as polyester and fibreglass mats according to plans and specifications
E-12.02.05	install protection layer such as sanded base sheet, rigid asphalt board and polyethylene sheet

Sub-task

E-12.03 Installs green, sustainable, vegetative and protected membrane components.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

E-12.03.01	visually inspect protection layer for defects such as holes, gouges and debris
E-12.03.02	repair protection layer and waterproof membrane as needed
E-12.03.03	select and use tools and equipment such as wheel barrows, cranes, gravel buckets, shovels and conveyers
E-12.03.04	apply overburden components such as drainage mats, extruded polystyrene insulation, filter fabrics and ballast according to specifications
E-12.03.05	apply green, sustainable and vegetative waterproofing components such as root barriers, moisture retention mats, irrigation system and growing medium according to specifications

Task 13 Damp-proofs surfaces.

Context

Damp-proofing involves sub-grade and exterior vertical applications in areas that are typically not under hydrostatic pressure. Installations do not require a membrane and can be completed with single or multi-coat applications.

Required Knowledge

K 1	types of primers such as water-based and solvent-based
K 2	application methods such as spraying, rolling, brushing and trowelling
K 3	effects of environmental conditions on application
K 4	types of coatings such as fibrated, non-fibrated and rubberized
K 5	number of coats required
K 6	protection layers for damp-proofing
K 7	securing methods for protection layers

Sub-task

E-13.01 Applies coatings.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

E-13.01.01	identify below-grade hazards such as cave-ins from dirt or rocks, uneven working surface, buried utility lines, and un-shored slopes
E-13.01.02	prepare surface by cleaning, scraping, and priming to accept coating
E-13.01.03	select and use tools such as trowels, brushes, rollers and spray applicators according to coating selected
E-13.01.04	select and install coating such as liquid, trowel and brush grade according to specifications

Sub-task

E-13.02 Applies protection layer.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

E-13.02.01	select protection layer such as asphalt boards, rigid insulations, geo-textiles and drainage mats according to specifications
E-13.02.02	select and use tools such as hammer drills, trowels and caulking guns to secure protection layer
E-13.02.03	cut, fit and place protection layer
E-13.02.04	secure protection layer using application products such as adhesives and fasteners

BLOCK F — ROOF MAINTENANCE AND REPAIR

Trends

There is a decrease in the use of hot asphalt for repair and maintenance. Due to environmental concerns, the use of cold products for repairing and maintaining roof systems has increased. Building owners are more aware of the advantages of maintaining the roof and are investing in maintenance programs. There is an increasing use of infra-red thermal scans and moisture meters to assess roof condition.

Related Components (including, but not limited to)

Caulking, mastics, sealants, drains, membranes, gravel, ballast, flashings, fasteners, asphalt, propane, roof system materials, primers.

Tools and Equipment

Hand tools, power tools, pneumatic tools, propane-fuelled equipment, hoisting, lifting and rigging equipment, hot process equipment, motorized equipment, PPE and safety equipment, disposal equipment.

Task 14 — Assesses roof condition.

Context

Roofers assess roof conditions to determine what actions are required to maintain a roof's performance, as acceptable to the owner.

Required Knowledge

K 1	roof systems such as single-ply, modified bitumen and built-up roofing
K 2	when to inspect the roof
K 3	where to look for defects
K 4	history of leaks and past repairs
K 5	types of defects such as loose flashings, deteriorated caulking and sealants, and deteriorated membranes
K 6	potential causes of damage such as mechanical equipment, doorways, ice build-up and wind
K 7	compatibility of material with roof system
K 8	when and where to perform a cut test
K 9	composition of the roof

K 10	repair techniques
K 11	types of maintenance such as caulking, refilling penetration pockets and securing loose flashing

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Sub-task

F-14.01 **Performs roof inspections.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

F-14.01.01	identify roof system
F-14.01.02	visually inspect building structure for signs of environmental and physical damage to identify extent of damage and area to be maintained or repaired
F-14.01.03	identify areas of roof that require immediate or future repair by looking for defects such as alligatoring, bare spots, ballast displacement, and missing and damaged tiles, flashings and shingles
F-14.01.04	identify cause of deficiencies such as manufacturers' defects, environmental factors and poor installation
F-14.01.05	select and use tools and equipment such as cameras and portable recording devices
F-14.01.06	record inspection observations

Sub-task

F-14.02 **Performs cut test.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

F-14.02.01	remove a sample area to test system components
F-14.02.02	record cut test findings
F-14.02.03	patch cut test area temporarily or permanently
F-14.02.04	select and use tools such as reciprocating saws, utility knives, trowels and cameras

Sub-task

F-14.03 **Determines maintenance or repair required.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

F-14.03.01	interpret cut test and inspection results to determine next step such as maintenance, repair or replacement
F-14.03.02	determine feasibility of maintenance or repair according to roof system condition
F-14.03.03	determine time frame required for maintenance or repair
F-14.03.04	determine if temporary or permanent repair can be performed
F-14.03.05	provide inspection report and recommendations

Task 15 Maintains and repairs roof.

Context Roofers perform roof maintenance and repair to address normal wear and damage in order to extend the service life of roof systems.

Required Knowledge

K 1	types of drains such as internal and external and their components
K 2	installation of drains and scuppers
K 3	types of maintenance such as removal of debris and vegetation
K 4	types of roof systems such as flat, low and steep slope and their installation
K 5	types of penetration pockets such as metal, wood and concrete
K 6	types of sealant such as mastic and two-part sealer
K 7	types of caulking such as silicone, polyurethane and latex and their application
K 8	types of steep slope roofing material such as shingles, tiles and metal
K 9	effect of environmental conditions on caulking and sealant
K 10	curing times for caulking and sealant
K 11	types of membranes such as asphalt impregnated felt, modified bituminous material, EPDM and TPO
K 12	defects such as blisters, ridges, splits, rips and de-lamination

K 13	repair techniques such as cold and hot process repair
K 14	types of ballast such as gravel, pavers and cement-top insulation
K 15	types of surfacing such as granular, coating and gravel
K 16	when surface requires resurfacing
K 17	compatibility of materials used
K 18	effects of environmental conditions on surfaces
K 19	types of fasteners such as screws, nails and clips
K 20	types of flashings such as cap, counter, steps, valley and thru-wall
K 21	flashing installation

Sub-task

F-15.01 Maintains drains and scuppers.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

F-15.01.01	remove obstructions from drains and scuppers
F-15.01.02	dismantle and reassemble drain components such as clamps and strainer baskets to reseal
F-15.01.03	reseal drains and scuppers to return to serviceable condition
F-15.01.04	select and use tools such as wrenches, screw drivers and caulking guns

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Sub-task

F-15.02 Refills penetration pockets.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

F-15.02.01	verify penetration pocket is well secured
F-15.02.02	clean surface of existing sealant for adhesion of replacement sealant
F-15.02.03	select and use compatible sealant with roof system
F-15.02.04	crown mastic in penetration pocket to ensure water-shedding

F-15.02.05	mix and install two-part sealer according to manufacturers' specifications
F-15.02.06	select and use tools such as caulking guns, trowels and utility knives

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Sub-task

F-15.03 Replaces deteriorated caulking.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

F-15.03.01	remove old caulking material by using methods such as pulling or scraping
F-15.03.02	clean surface to ensure adhesion of new material
F-15.03.03	select type and colour of caulking according to job specifications
F-15.03.04	apply caulking by using tools such as caulking guns and specialized tooling devices

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Sub-task

F-15.04 Repairs membrane defects.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

F-15.04.01	prepare surface prior to repair by cleaning, drying and priming
F-15.04.02	reseal membranes to serviceable condi ns according to type of membrane
F-15.04.03	select and use tools such as trowels, torches, hot air welders and rollers

Sub-task

F-15.05 **Reapplies surfacing and ballast to bare areas.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

F-15.05.01	prepare surface prior to resurfacing by cleaning and priming
F-15.05.02	determine application methods of surfacing according to type of roof membrane
F-15.05.03	resurface membrane with materials such as granules, gravel, coatings and ballast
F-15.05.04	select and use tools and equipment such as torches, shovels, brooms and rollers

Sub-task

F-15.06 **Repairs steep roofing defects.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

F-15.06.01	remove and replace damaged roofing material such as asphalt shingles, cedar shingle shakes, roof tiles and pre-formed metal sheets
F-15.06.02	remove and replace components such as vents and neoprene boots
F-15.06.03	reposition and re-secure displaced roofing material according to original application such as reapplying mortar and resealing tiles and shingles
F-15.06.04	select and use tools such as pry-bars, drills and caulking guns

Sub-task

F-15.07 Re-secures loose metal flashings.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	NV	yes	yes	yes	yes	yes	yes	yes	NV	NV	NV

Key Competencies

F-15.07.01	install fasteners to secure metal flashings
F-15.07.02	apply caulking to ensure seal of flashing
F-15.07.03	select and use tools such as pry-bars, drills, tin snips and hatchets

APPENDICES

APPENDIX A — TOOLS AND EQUIPMENT

Hand Tools

adhesive spreader
air and material hoses
aviation snips (left and right handed)
axe
bevel square
broom
bucket/pail
caulking gun
chalk line
chisels
dollies
drying mop
electric drill
flashlight
folding pliers
grub hoe
hacksaw
hammer
hammer stapler
hand roller
hand saw
hand spudder
hatchet
hot wires
infrared heat gun
keyhole saw
manual gravel spreader
manual insulation carrier
measuring tape
mechanical tape applicator
mop
pipe wrench
plane
pop riveter
power seamer
pry bar
rake
roof jack
roof lifter
roofer knife
sawhorse
scanners
scissors
scoop shovel
scraper
screwdriver
seam roller
shears
shovel
slater punch
sliding T-bevel
spade
spud bar
squeegee
staple gun
thermometer
tile nippers
tin snips
trowel
t-square
water extractor
welders
wheelbarrow
wrench

Power Tools, Pneumatic Tools and Propane-Fuelled Equipment

air compressor
backpack blower
concrete saw
electrical cord
generator
hammer drill
hot air gun
hot air welder

Power Tools, Pneumatic Tools and Propane-Fuelled Equipment (continued)

industrial vacuum
nibbler
pneumatic caulking gun
pneumatic nailer
pneumatic spray gun
power mixer
power saws (chain, concrete, quick-cut, circular)
power vac
pressure washer
primer machine
propane tank
pump
roll carrier
roller
screw gun
spray gun and nozzle
tile cutter
torch
unishear

Hoisting, Lifting and Rigging Equipment

A-frame hoist
bottle cages
conveyor
crane
gravel bucket
gravel hopper
hand hoist
hydraulic hoist
ladder
ladder hoist
ladder jack
ladder pulley
lifting fork
mechanical hoist
monorail hoist
swing hoist

Hot Process Equipment

agitator kettle
asphalt spreader
automated seamer
bitumen kettle
bitumen mop
bitumen pump and piping
bitumen tanker
degranulator
dipper
felt laying machine
hot tanker/carrier
hot tar kettle
mini mop
mop cart
truck tanker
wheeled asphalt bucket

Motorized Equipment

chainsaw
forklift
man-lift
mechanical broom
mechanical scraper
mechanical spudder
power broom
power buggy
power gravel spreader
power insulation carrier

Motorized Equipment (continued)

power scraper or spudder
power spreader
rocker
roof cutter
roof cutting machine
scissor lift
skid steer loader
snow blower
tear-off machine

Personal Protective Equipment and Safety Equipment

cuffless pants
hearing protection
eye wash bottle
face shield
fire extinguisher
first aid kit
gloves
guard rails
hard hat
heat sensors
lanyard (rope)
long sleeves
mask
respirator
safety boots
safety fence
safety glasses
safety harness

Disposal Equipment

disposal bin
disposal chute
garbage bags
garbage chute
garbage tray
wheelbarrow

APPENDIX B — GLOSSARY

asphalt	although there are natural occurring asphalts, those used in roofing in Canada are from the heavy end of petroleum distillation and can be obtained in a great range of viscosities and softening points
bitumen	a generic term describing any mixture of heavy hydrocarbons in viscous or solid form; in the roofing industry, the word covers both asphalt and coal tar pitch
caulking/sealant	any of a wide range of bituminous, rubber, plastic or other materials suitable for filling seams or cracks to make them tight against water leakage and remain plastic for an extended time after application
cricket	a device that is used to divert water at the intersections of roofs or at the intersection of a roof and chimney (also called saddle)
deck	the structural roof to the top surface of which a roof covering system is applied
drip edge	the formed edge on metal installed at the eaves of a roof
dunnage	wood or other material used to support or protect components also known as blocking or cribbing
eave	the edge of a sloped roof
fabric	a woven cloth of organic or inorganic filaments treated with bitumen and, being stronger than felt, used in special flashing applications
fascia	any cover board at the edge or eaves of a flat or sloping overhanging roof
felt	a mat of organic or inorganic fibres, in sheet form impregnated with asphalt or coal tar, and supplied in roll form
flashing - membrane flashing	a continuation of the roofing proper to cover any element of the roof structure departing from the roof deck incline
flashing - base flashing (metal)	sheet metal covering the cant and up the vertical surface, protecting the membrane

flashing - cap flashing	the covering, usually sheet metal, over the base flashing, or capping a higher wall, such as a parapet
flashing - counter flashing	sometimes used for the upper portion of the sheet metal flashing when the metal flashing is divided into two pieces (see also cap flashing)
flashing - step flashing	individual pieces of flashing material used to flash the sides of chimneys and dormers and similar projections on steeper sloping roofs, usually shingled; the individual pieces are overlapped and stepped up the slope
flashing - thru-wall flashing	flashing extending completely through a masonry wall to prevent water infiltrating behind lower elements of the flashing system and of the roofing system
flat roof	roof under 1:4 pitch (single unit)
hip	the high point where 2 sloped planes meet
insulation	see roof insulation
inverted roofing system	a roofing system wherein the roofing membrane is applied to the sloped structural deck and the insulation is placed outward of the membrane and ballasted
kettle temperature	the temperature of the hot material in the kettle
lap	the part of shingles, roll roofing or felt covered in application by the following course or ply
- edge lap	the overlap of the edge of a ply over the previous ply
- end lap	the overlap of the start of a roll over the end of the previous roll
membrane	the waterproof covering; it may be a single-ply system or a multi-ply system
mopping	a layer of hot bitumen mopped between layers of roofing
pitch	slope of the roof
plastic cement	although all caulking cements could be called plastic cements, there is a commonly held acceptance in the roofing industry that plastic cement means bituminous cement; these can be either asphalt or coal tar base with the former much more common; (see also caulking cement)

plastic pan	also called pitch pan, pitch pocket, gum box, these comprise a flanged collar placed around items that project through the roof system; the flange is properly set into the roof membrane and the pan is well filled with plastic cement; these pans are a constant source of trouble and should only be used when no other solution can be found
primer	a thin liquid compound applied to a surface to improve the adhesion of a thicker liquid compound; the most commonly used is asphalt primer
protected membrane roof (PMR)	a roofing system wherein the roofing membrane is applied to the sloped structural deck and the insulation is placed outward of the membrane and ballasted (also called inverted roof, upside down roof)
ridge	the top of a sloped roof
saddle	a small false roof or the elevation of a part of the roof surface used to divert water from behind an obstacle, such as a chimney (also called cricket)
scupper	a perimeter drain for roofs
shingles	any materials used in multi unit roof
slope	the incline or pitch of a roof surface
snow guards	a roofing projection that is installed on sloped roofs to ensure that large sheets of ice or snow do not fall; similar to snow rails
stapling	the use of a specially designed staple gun and staples instead of a hammer and roofing nails in roofing application
starter strip	a roofing material applied at the eaves and serving as a base for the first course of roofing
substrate	the surface upon which the roofing or waterproofing membrane is placed. It may be structural deck or insulation or any other base material
surfacing	any material used as a protective covering on the weather surface of a roof
underlayment	material that is laid under the roofing and provides a secondary form of protection

valley	the low point where two sloped planes meet
vapour barrier	a material, usually in sheet form, used to retard the passage of water vapour into a wall or roof
vapour retarder	material used to retard the passage of vapour or moisture into the roof system where harmful condensation of vapour within the system could take place
venting	in built-up roofing the installation of special provisions to allow the roof insulation to vent to the outside; this can be done at roof edges, at parapet walls, by installation of special roof vents and expedited by using roof insulation which will allow air and vapour movement

APPENDIX C ACRONYMS

BUR	built-up roofing
EPDM	ethylene-propylene-diene monomer
EVT	equiviscous temperature
MSDS	Material Safety Data Sheets
OH&S	Occupational Health and Safety
PMA	Protected Membrane Assemblies
PMR	Protected Membrane Roofs
PPE	Personal Protective Equipment
LEED	Leadership in Energy and Environmental Design
PVC	polyvinyl chloride
SBS	styrene-butadiene-styrene
TPO	thermoplastic polyolefin
UV	Ultra Violet
WHMIS	Workplace Hazardous Materials Information System

APPENDIX D — BLOCK AND TASK WEIGHTING

BLOCK A COMMON OCCUPATIONAL SKILLS

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	NV	15	NV	15	20	5	15	12	10	15	NV	NV	NV	14%

Task 1 Performs safety related functions.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	52	NV	35	25	45	33	26	10	25	NV	NV	NV	31%

Task 2 Maintains and uses tools and equipment.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	22	NV	30	25	25	33	26	45	35	NV	NV	NV	30%

Task 3 Performs common work practices and procedures.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	26	NV	35	50	30	34	48	45	40	NV	NV	NV	39%

BLOCK B ROOF PREPARATION

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	NV	23	NV	17	15	20	15	20	15	10	NV	NV	NV	17%

Task 4 Prepares roof for replacement.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	50	NV	45	50	60	70	65	65	60	NV	NV	NV	58%

Task 5 Prepares deck for roof installation.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	50	NV	55	50	40	30	35	35	40	NV	NV	NV	42%

BLOCK C LOW SLOPE AND FLAT ROOFING

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	NV	20	NV	27	25	30	35	38	35	40	NV	NV	NV	31%

Task 6 Applies roofing components.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	44	NV	46	45	50	50	45	50	40	NV	NV	NV	46%

Task 7 Applies membranes.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	56	NV	54	55	50	50	55	50	60	NV	NV	NV	54%

BLOCK D SHINGLES, TILES AND PRE-FORMED METAL ROOFING

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	NV	15	NV	12	15	25	10	10	20	15	NV	NV	NV	15%

Task 8 Performs common steep slope practices.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	30	NV	34	30	30	30	27	15	30	NV	NV	NV	28%

Task 9 Applies shingles.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	22	NV	35	55	30	20	30	65	30	NV	NV	NV	36%

Task 10 Applies roof tiles.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	23	NV	0	15	20	20	10	5	30	NV	NV	NV	15%

Task 11 Applies pre-formed metal roofing.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	25	NV	31	0	20	30	33	15	10	NV	NV	NV	21%

BLOCK E WATERPROOFING AND DAMP-PROOFING

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	NV	14	NV	11	10	10	5	5	10	10	NV	NV	NV	9%

Task 12 Waterproofs surfaces.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	52	NV	63	65	50	50	70	50	90	NV	NV	NV	61%

Task 13 Damp-proofs surfaces.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	48	NV	37	35	50	50	30	50	10	NV	NV	NV	39%

BLOCK F ROOF MAINTENANCE AND REPAIR

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	NV	13	NV	18	15	10	20	15	10	10	NV	NV	NV	14%

Task 14 Assesses roof condition.

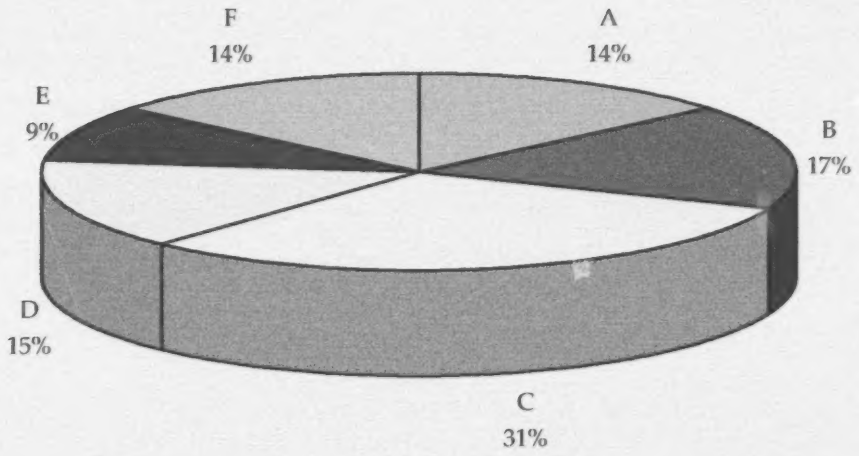
	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	46	NV	42	45	50	40	45	20	25	NV	NV	NV	39%

Task 15 Maintains and repairs roof.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	54	NV	58	55	50	60	55	80	75	NV	NV	NV	61%

APPENDIX E

PIE CHART*



TITLES OF BLOCKS

BLOCK A	**Common Occupational Skills**	**BLOCK D**	**Shingles, Tiles and Pre-Formed Metal Roofing**
BLOCK B	**Roof Preparation**	**BLOCK E**	**Waterproofing and Damp-Proofing**
BLOCK C	**Low Slope and Flat Roofing**	**BLOCK F**	**Roof Maintenance and Repair**

*Average percentage of the total number of questions on an interprovincial examination, assigned to assess each block of the analysis, as derived from the collective input from workers within the occupation from all areas of Canada. Interprovincial examinations typically have from 100 to 150 multiple-choice questions.

APPENDIX F

TASK PROFILE CHART – Roofer

BLOCKS	TASKS	SUB-TASKS				
A – COMMON OCCUPATIONAL SKILLS	1. Performs safety related functions.	1.01 Uses personal protective equipment (PPE) and safety equipment.	1.02 Maintains safe work environment.			
	2. Maintains and uses tools and equipment.	2.01 Maintains tools and equipment.	2.02 Uses hoisting, lifting and rigging equipment.	2.03 Uses motorized equipment.		
	3. Performs common work practices and procedures.	3.01 Interprets blueprints and drawings.	3.02 Estimates material.	3.03 Assesses worksite conditions.	3.04 Communicates with others.	3.05 Accesses work area.
		3.06 Positions equipment and material on the ground and on the roof.	3.07 Prepares material disposal systems.			
B – ROOF PREPARATION	4. Prepares roof for replacement.	4.01 Protects surrounding area.	4.02 Removes loose debris.	4.03 Removes roofing and flashings.	4.04 Prepares roof substrate.	4.05 Performs minor adjustments to penetrations, curbs and parapets.
		4.06 Installs water cut-off, temporary seals and temporary drains.				
	5. Prepares deck for roof installation.	5.01 Inspects deck.	5.02 Cleans deck.	5.03 Verifies placement of roof penetrations, curbs and parapets.	5.04 Dries deck.	

BLOCKS	TASKS	SUB-TASKS				
C – LOW SLOPE AND FLAT ROOFING	6. Applies roofing components.	6.01 Installs levelling surface.	6.02 Primes substrate.	6.03 Applies vapour retarder, vapour barrier and air barrier.	6.04 Installs insulation.	6.05 Installs cover board.
		6.06 Installs drains, vents, curbs and penetrations.	6.07 Applies ballast, walkways and protective surfaces.	6.08 Installs metal flashings.		
	7. Applies membranes.	7.01 Relaxes membranes.	7.02 Sets membranes.	7.03 Applies membranes using hot-liquid process.	7.04 Applies membranes using torched-on method.	7.05 Applies membranes using hot-air welding.
		7.06 Applies membranes using cold process.	7.07 Applies membranes using mechanical fasteners.	7.08 Applies loose-laid membranes.	7.09 Installs membrane flashings.	
D – SHINGLES, TILES AND PRE-FORMED METAL ROOFING	8. Performs common steep slope practices.	8.01 Installs steep slope underlayment.	8.02 Installs attic vent flashings.	8.03 Installs valley treatments.	8.04 Installs saddles/crickets.	8.05 Installs metal flashings for steep slope roofs.
	9. Applies shingles.	9.01 Determines layout of shingles.	9.02 Installs starter strips.	9.03 Fastens shingles.	9.04 Cuts shingles.	9.05 Tabs shingles.
	10. Applies roof tiles.	10.01 Installs strapping.	10.02 Fastens roof tiles.	10.03 Cuts roof tiles.	10.04 Installs closure strips.	10.05 Seals ridge and hip caps.
	11. Applies pre-formed metal roofing	11.01 Installs strapping for pre-formed metal roofing.	11.02 Fastens pre-formed metal roofing.	11.03 Cuts sheet metal.	11.04 Installs closure strips for pre-formed metal roofing.	11.05 Installs snow guards.

BLOCKS	TASKS	SUB-TASKS				
E – WATERPROOFING AND DAMP-PROOFING	12. Waterproofs surfaces.	12.01 Prepares waterproofing substrates.	12.02 Applies waterproofing membrane.	12.03 Installs green, sustainable, vegetative and protected membrane components.		
	13. Damp-proofs surfaces.	13.01 Applies coatings.	13.02 Applies protection layer.			
F – ROOF MAINTENANCE AND REPAIR	14. Assesses roof condition.	14.01 Performs roof inspections.	14.02 Performs cut test.	14.03 Determines maintenance or repair required.		
	15. Maintains and repairs roof.	15.01 Maintains drains and scuppers.	15.02 Refills penetration pockets.	15.03 Replaces deteriorated caulking.	15.04 Repairs membrane defects.	15.05 Reapplies surfacing and ballast to bare areas.
		15.06 Repairs steep roofing defects.	15.07 Re-secures loose metal flashings.			